ANNEX G

PROJECT WEST FORD EXPERIMENT

(To be used only on foreign initiative)

BACKGROUND

1. Project WEST FORD is a United States space communications experiment involving the placing of hair-like metallic filaments (dipoles) into a relatively short-lived orbital belt around the earth. The purpose of the experiment is to investigate the technical feasibility of using orbiting dipoles as passive reflectors for relaying communications and to provide an opportunity for objective assessment of possible effects of further experimentation or an operational version of this technique on space activities or on any branch of science.

2. The first launch of a Project WEST FORD package took place on October 21, 1961 when an Air Force Atlas-Agena B carried into orbit a dispenser package containing 75 pounds of dipoles embedded in napthalene. The package was expected to release the fibers in such a way that they would gradually disperse to form a thin, narrow, circular orbital ring about 40,000 miles long at an altitude of about 2,000 miles. An investigation by the Lincoln Laboratory of the Massachusetts Institute of Technology, civilian contractor for the experiment, revealed that the dipoles were not dispensed from the package and are not likely to break down further the five or six small clumps which have been tracked for several months by MIT radar. A report by the Lincoln Laboratory on these modifications and on their investigation of the first attempt, together with a covering letter from the Space Science Board of the National Academy of Sciences, was released on March 11, 1962. Copies of those documents are enclosed at ANNEX D and ANNEX E.

3. A backup launch of a second modified WEST FORD package is currently scheduled for this spring. The modifications will provide better surveillance and control over the behavior of the package. They are: (a) a mechanism to permit the package to be ejected from the parent vehicle by ground command and only if an orbit is attained in which the lifetime of the dipole belt will be of short duration and (b) telemetry in the package that will indicate the position of the package, spin and tumble rate and the extent of dipole dispensing.

ANTICIPATED FOREIGN POSITION

4. Some foreign scientists have expressed concern about possible interference of the experiment with optical and radio astronomy, if it is longer-lived than estimated. These expressions of concern were made both before and after the launch of the first WEST FORD package. In addition, Soviet scientists have expressed the fear that the experiment may interfere with manned space flights. It is possible that charges may be made that the United States is "contaminating" outer space, that we are unilaterally (and in the face of objections by foreign scientists) performing experiments which interfere with the peaceful scientific pursuits of others, and, since the experiment is sponsored

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by the United States Air Force, that we are using space for military purposes.

UNITED STATES POSITION

5. The general views of the United States respecting the Project WEST FORD experiment are as follows:

(a) Project WEST FORD is an imaginative experiment, which will contribute to scientific knowledge as well as to a better understanding of the feasibility of a new communications technique.

(b) The experiment has been very carefully planned to avoid interference with other space activities and other scientific pursuits. The experiment was reviewed by a special panel of the President's Science Advisory Committee (their report is attached as ANNEX B), which concluded that "the United States can proceed with the Project WEST FORD communications experiment without danger to science." Earlier, the Space Science Board of the United States National Academy of Sciences had reached a similar conclusion (the statement of the Board is attached as ANNEX C).

(c) The thorough consideration of the experiment within the United States Government included coordination through the National Aeronautics and Space Council. On the recommendation of the Council, the President issued a policy statement (ANNEX A). This policy provides that no additional launches of orbiting dipoles will be planned until the results of this experiment have been analyzed and evaluated and that findings of foreign as well as United States scientists will be taken into consideration. To this end, foreign scientists have been invited to participate by making measurements and observations.

(d) Since the first launch did not result in an orbital belt of dipoles and, in the opinion of the Lincoln Laboratory and the Space Science Board of the United States National Academy of Sciences, will not form such a belt, the forthcoming backup launch is considered part of the initial experiment. If this effort is successful, no further launches will be planned until the results have been analyzed and evaluated as provided in the President's policy statement. The improved ground support and package features of the backup effort give more promise of a successful and more acceptable (i.e. shorter-lived) orbit than the first effort.

(e) The experiment has been discussed more thoroughly in advance with a broad range of scientists of other countries than any other space experiment. If certain astronomers of other countries remain concerned, we regret it, but the extensive discussions which have been held do not, in our view, develop cause for such concern. It should be noted that at no time has any other government expressed official concern to the United States.

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(f) The military interest in the experiment is in determining whether the orbiting dipoles can serve as a useful communications technique. However, as the President has made clear in his policy statement, we are not now committed to use the technique operationally. It should be remembered that effective military communications can be important in ensuring the timely and accurate flow of information necessary to lessen the risk of war by accident or miscalculation.

6. In presenting the foregoing arguments, we should affirm both our recognition of the need for acting responsibly in the conduct of our space activities and our belief that we have indeed acted responsibly in this instance. It might also be pointed out that the dipole belt, once in orbit, will be available for the experimental use of the scientists of any nation. However, while emphasizing that we have consulted foreign scientists extensively (not only in this instance but, in contrast with the Soviet Union, in many others as well) and while expressing our appreciation of the value and desirability of such consultation, we should take exception to any insistence that consultation with and approval by other countries are prerequisites to conduct of our space activities. We should refrain from any unilateral commitments respecting such consultation or approval in the future. (Such commitments would not be compatible with our view that outer space is freely available for exploration and use consistent with the United Nations Charter and other international law and agreements and would place presently unacceptable limits on our freedom of action)

DISCUSSION

7. Under United States Air Force sponsorship, Project WEST FORD is being conducted by scientists of the Lincoln Laboratory of the Massachusetts Institute of Technology. Its name is derived from that of the Massachusetts town where a MIT research installation is located.

8. The experiment has been reviewed in detail by qualified scientists a number of times. A special panel of the President's Science Advisory Committee reported specifically that the experiment "will not impair our ability to study the skies -- either by visible or ultraviolet light or by the reception of radio signals" and also that it "will offer no additional hazard to manned space flight." This report had been preceeded by studies by the Space Science Board of the United States National Academy of Sciences which had reached similar conclusions with respect to the effects of the experiment on other branches of science.

9. Facts regarding the experiment have been made public. In September 1960 a paper on the orbiting dipoles techniques was presented to the International Scientific Radio Union. In April 1961, the findings of the Space Science Board

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together with a series of technical articles were published in the Astronomical Journal. Reprints were provided by the National Academy of Sciences to some 600 foreign astronomers. Additional data were published in SCIENCE, October 6, 1961. The report of the Lincoln Laboratory and the covering letter of the Space Science Board on the results of the first launch attempt and the modifications planned for the second were sent to members of the WEST FORD Committee of the International Astronomical Union (IAU), to officers of the Committee on Space Research (COSPAR) and the International Scientific Radio Union (URSI) of the International Council of Scientific Unions (ICSU) and to individual scientists and scientific institutions in the US and abroad on March 8, 1962. They were released to the public on March 11, 1962.

10. The viewpoint of those foreign astronomers who have objected was expressed in two resolutions adopted last year by the International Astronomical Union as well as in discussions with United States scientists. That viewpoint can be summarized as follows:

(a) They recognize that the experiment as planned will not interfere with their activities. However, they fear that the experiment will not take place as planned. In particular, they are concerned lest the lifetime of the belt should prove longer than anticipated. Under those circumstances, future improvements in astronomical equipment and techniques might, they believe, be hampered by continuation of the belt for a prolonged period.

(b) They feel that one experiment may lead to another and ultimately to the use of "operational" belts. Although the quantity of dipoles in the Project WEST FORD experiment may be small, they believe that the additional or larger quantities involved in further activities might create problems.

11. The United States plan for the WEST FORD experiment offers reassuring answers to the fears which have been expressed by certain astronomers:

(a) Insofar as the life of the belt is concerned the planned launching conditions are such that during a period of several years (say, 4 to 8 years), the dipoles are expected to re-enter the earth's atmosphere and to be destroyed on re-entry. The modifications in the second package should assure that a proper orbit is attained. However, even should the dipoles be longer-lived than expected, the belt itself would be diffused with time, and no impediment to scientific observations with improved instruments and techniques should be posed by the experiment.

(b) The President's policy statement on Project WEST FORD should have made it clear that the United States does not plan to consider the question of additional belts until results of the first have been analyzed and evaluated.

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12. In a letter to the United States National Academy of Sciences, the Soviet Academy has expressed concern about possible effects of the dipole belt on manned space vehicles. However, our scientists are satisfied that any space vehicle protected against the impact of micrometeorites already in space will be adequately protected against the dipole belt.

ANNEXES

A. The President's Policy Statement of August 8, 1961 (Enclosed with the Position Paper on Project WEST FORD dated October 12, 1961)

B. Statement by the special panel of the President's Science Advisory Committee issued on October 4, 1961. (Enclosed with the Position Paper on Project WEST FORD dated October 12, 1961)

C. Statement by the Space Science Board of the National Academy of Sciences on August 11, 1961. (Enclosed with the Position Paper on Project WEST FORD dated October 12, 1961)

D. Memorandum issued by the Space Science Board of the National Academy of Sciences on March 8, 1962.

E. Status Report issued by the Lincoln Laboratory on March 1, 1962.